

## CLAIMS:

1. An analogue navigation device comprising a transmitter for generating a light signal, a receiver for receiving the light signal, a light guide having a surface for internally reflecting the light signal from the transmitter to the receiver, and an actuator having a surface, said actuator surface having at least a portion which is movable between a first position in which it is spaced apart from a portion of said light guide surface with a gas or fluid therebetween, and a second position in which it is in contact with said portion of said light guide surface, said portion of said light guide surface having a higher refractive index than said portion of said actuator surface and said portion of said actuator surface having a different refractive index than said gas or fluid, whereby in use the relative refractive index is changed at the contacted portion of the light guide surface thereby altering the light signal received by the receiver.
- 15 2. An analogue navigation device according to claim 1, whereby in use said receiver outputs a signal indicative of the position of the contacted portion of the light guide surface.
- 20 3. An analogue navigation device according to claim 1 or claim 2, whereby in use said received signal is used to control the position of an element
- 25 4. An analogue navigation device according to any preceding claim, wherein said second position is at a selected one of a plurality of portions on the surface of the light guide.
5. An analogue navigation device according to any preceding claim, wherein a plurality of transmitters is provided.
- 30 6. An analogue navigation device according to claim 5, wherein the transmitters are arranged to pulse alternatively.

7. An analogue navigation device according to any preceding claim, wherein a plurality of receivers is provided.

8. An analogue navigation device according to any preceding claim, wherein  
5 the or each transmitter is an LED.

9. An analogue navigation device according to any preceding claim, wherein  
the or each receiver is a photodiode.

10 10. An analogue navigation device according to any preceding claim, wherein  
four transmitters and a single receiver are provided in a cross configuration  
having four corners and a centre, each one of the transmitters being disposed at  
one of the corners and the receiver being disposed at the centre.

15 11. An analogue navigation device according to any preceding claim, wherein  
the light guide includes an optical grating.

12. An analogue navigation device according to any preceding claim, wherein  
said surface of said actuator is a hemispherical surface.

20 13. An analogue navigation device according to any preceding claim, wherein  
said surface of said actuator is supported by one or more side walls.

25 14. An analogue navigation device according to claim 11, wherein said one or  
more side walls are deformable.

15. An analogue navigation device according to any preceding claim, wherein  
said surface of said actuator is deformable.

30 16. An analogue navigation device according to any preceding claim, wherein  
said actuator has an upper portion in the form of a stick for actuation by a user.

17. An analogue navigation device according to any preceding claim, wherein said actuator comprises an arcuate disk disposed on said surface of said actuator.

5 18. An analogue navigation device according to any preceding claim, wherein the or each transmitters and the or each receivers are disposed in a layer on an opposite side of said light guide to said actuator.

10 19. An analogue navigation device according to any preceding claim, further comprising a processing device for processing the or each signal received by the or each receiver and outputting a control signal to control the position of the element.

15 20. An analogue navigation device according any preceding claim, further comprising a display for displaying an element, whereby in use the position of the element on the display is controlled.

20 21. An analogue navigation device according to any preceding claim, wherein said received signal is used to produce a radio signal for controlling a radio controlled device.

22. An analogue navigation device according to any preceding claim, wherein the actuator surface is exposed at the exterior of the device.

25 23. A hand held electronic device according to any preceding claim, wherein the actuator surface is manually actuatable by a user of the device.

24. An analogue navigation device substantially as described herein with reference to Figures 1-12 of the accompanying drawings.

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25. A hand held electronic device comprising the analogue navigation device according to any preceding claim.

26. A hand held electronic device as claimed in claim 25, wherein the actuator surface is exposed at the exterior of the device.

5 27. A hand held electronic device as claimed in claim 26, wherein the actuator surface is manually actuatable by a user of the device.

28. A hand held electronic device as claimed in any of claims 26 to 27, wherein the actuator surface is actuatable by a user via a key of the device.

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29. A hand held electronic device as claimed in claim 28, wherein the key is part of a keypad.

15 30. A hand held electronic device substantially as described herein with reference to Figures 1-12 of the accompanying drawings.

31. A method of navigating comprising generating a light signal and reflecting the light signal off a surface, wherein the relative refractive index between materials on either side of the surface is changed thereby altering the reflected 20 light signal, said reflected light signal being received and used to control the position of an element.

32. A key device comprising a transmitter for generating a light signal, a receiver for receiving the light signal, a light guide having a surface for internally 25 reflecting the light signal from the transmitter to the receiver, and an actuator having a surface, said actuator surface having at least a portion which is movable between a first position in which it is spaced apart from a portion of said light guide surface with a gas or fluid therebetween, and a second position in which it is in contact with said portion of said light guide surface, said portion of said light 30 guide surface having a higher refractive index than said portion of said actuator surface and said portion of said actuator surface having a different refractive index than said gas or fluid, whereby in use the relative refractive index is

changed at the contacted portion of the light guide surface thereby altering the light signal received by the receiver.

33. A key device according to claim 32, whereby in use said receiver outputs a

5 signal indicative of the position of the contacted portion of the light guide surface.

34. A key device according to claim 32 or 33, wherein said actuator is a key or

button.

10 35. A key device according to claim 32 or 33, wherein said device further

comprises a key which moves said actuator in use.

36. A key device according to claim 34 or 35, wherein said device comprises a

plurality of keys.